FINDING OF NO SIGNIFICANT IMPACT
INDIAN RIVER INLET
SECTION 103, HURRICANE AND STORM DAMAGE REDUCTION (BEACH EROSION CONTROL)
SUSSEX COUNTY, DELAWARE

OVERVIEW

The United States Army Corps of Engineers (Corps) has evaluated the construction of a stone revetment at Indian River Inlet in Sussex County, Delaware. The Corps authority for the Indian River Inlet Project is Section 103, Hurricane and Storm Damage Reduction, of the Rivers and Harbors Act of 1962 as amended.

PURPOSE AND SPECIFICATIONS

The project area is the northern interior shoreline of Indian River Inlet, adjacent to the U.S. Coast Guard (USCG) Facilities located in Sussex County, Delaware. The new portion of the project extends approximately 270 ft from the existing USCG Station's bulkhead westward to the end of the 1988 Corps completed shore revetment project.

The project purpose is to protect approximately 900 feet of eroding shoreline on the north shore of Indian River Inlet. The original approved project was to construct a stone revetment 1,850 feet long and tie into the existing USCG bulkhead. To save costs, the 1988 construction was limited to 1580 feet; that portion of the shoreline actually eroding. The remaining approximately 270 feet of the unprotected shoreline along the northern interior of the Inlet has been subjected to increased erosion over the last decade. The purpose of this project is to complete the remaining 270 feet of the revetment and realize the full benefits of a shoreline with stone protection. In addition, there is 630 feet of the existing project (1988) that needs repair work as a result of 20 years of service, resulting in a total project length of approximately 900 feet. The alignment of the new stone revetment will reflect the contour of the eroded shoreline and the not the original revetment. This will minimize the amount of backfill needed for the stone revetment.

Furthermore, in 2005, as a result of the constant erosion and as a temporary solution to the problem, the non-federal sponsor, the Delaware Department of Natural Resources and Environmental Control (DNREC), placed approximately 18,000 sand bags on the project site. Our proposed stone revetment will be compatible and work in unison with the existing sand bags.

The USCG facility, Delaware Seashore State Park, and access to portions of the park and marina are being threatened. If nothing is done, the existing project will be flanked which will result in failure. This would endanger the existing State park property and the road.

COORDINATION

The project was developed by the Corps, DNREC, and the USCG.

The Environmental Assessment for the project was forwarded to the U.S. Environmental Protection Agency Region III, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, DNREC, and all other known interested parties.

ENDANGERED SPECIES IMPACT

The Environmental Assessment has determined that the selected plan, if implemented, would not jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

WATER QUALITY / CLEAN AIR ACT COMPLIANCE

There will be temporary impacts on the air and water quality during construction**.** However, pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate has been obtained for this project from DNREC. In addition, a General Conformity analysis under the Clean Air Act has determined that emissions associated with the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and

VOCs) in a Severe Nonattainment Area (25 tons of each pollutant per year). The project is not considered regionally significant under 40 CFR 93.153 (i).

COASTAL ZONE

Based on the information gathered during the preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(C) of the Coastal Zone Management Act of 1972 that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of Delaware. A consistency determination from DNREC has been obtained for this project.

CULTURAL IMPACTS

The 1978 Cultural Resources Overview by Gilbert/Commonwealth of Indian River and Bay designated the original (1988) shoreline protection project area as a low sensitivity zone with respect to prehistoric archaeological resources. An on-site inspection of the project area by the District Archaeologist in 2004 revealed no cultural deposits exposed in the eroding shoreline.

Although several historically important structures are located within the vicinity of Indian River Bay, none are within the proposed project's area of potential effect. In a letter dated February 24, 2005 the Delaware State Historic Preservation Office concurred with Philadelphia District that the proposed project will have no effect on cultural resources.

RECOMMENDATION

Because the Environmental Assessment concludes that the work described is not a major Federal action significantly affecting the human environment, I have determined that an Environmental Impact Statement is not required.

_____ _____

Date

Robert J. Ruch, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

ENVIRONMENTAL ASSESSMENT

INDIAN RIVER INLET
SECTION 103, HURRICANE AND STORM DAMAGE REDUCTION (BEACH EROSION CONTROL)

SUSSEX COUNTY, DELAWARE

PREPARED BY:
PHILADELPHIA DISTRICT
U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA 19107

FEBRUARY 2006

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1.0 Project Location

The project area is the northern interior shoreline of Indian River Inlet, adjacent to the U.S. Coast Guard Facilities located in Sussex County, Delaware (Figure 1). The project extends approximately 270 ft from the existing U.S. Coast Guard Station's bulkhead westward to the end of the 1988 Corps completed shore revetment project. In addition, the project will extend 630 ft past the 1988 project terminus for repair work needed on the original revetment structure. The total project length is approximately 900 ft (Figure 2).

2.0 Study Authority

The U.S. Army Corps of Engineers (Corps) authority for the Indian River Inlet Project is Section 103 of the River and Harbor Act of 1962 as amended, Shoreline Protection.

3.0 Purpose and Need for Action

The purpose of the project under Section 103 is to protect approximately 900 ft of eroding shoreline on the north shore of Indian River Inlet. To save costs, the construction of the original stone revetment (planned 1850 ft) in 1988 was limited to that portion of the shoreline actually eroding (1580 ft). The remaining approximately 270 feet of the unprotected shoreline along the northern interior of the Inlet has been subjected to increased erosion over the last decade (Photo 1 and Photo 2). In addition, project will extend 630 ft past the 1988 project terminus for repair work needed on the original revetment structure (Photo 3). The total project length is approximately 900 ft.

The purpose of this project is to complete the revetment and realize the full benefits of a shoreline with stone protection. The USCG facility, Delaware Seashore State Park, and access to portions of the park and marina are being threatened. If nothing is done, the existing project will be flanked which will result in failure. This would endanger the existing State park property and the road.

In 2005, as a result of the constant erosion and as a temporary solution to the problem, the sponsor, DNREC placed approximately 18,000 sand bags on the project site. Our proposed stone revetment will be compatible and work in unison with the existing sand bags.

4.0 Alternatives

Alternatives considered for protecting the north interior shoreline of Indian River Inlet included beach nourishment; stone, gabion, and grout-filled nylon bag revetment; and steel sheetpile bulkhead. The alternatives were considered with respect to project cost, habitat loss due to construction activities, destruction of benthic organisms, turbidity increases, and disturbances to fish and wildlife, especially during spawning, nesting, and migratory periods.

Adverse environmental impacts of stone, gabion or grout-filled nylon bag revetment placement along the proposed new 270 ft alignment would be short-term and a direct result of construction activities. Long-term impacts would be beneficial in nature due to stabilization of the eroding bank and the increase in heterogeneity caused by the placement of revetment.

A majority of short-term impacts would result from the cut and fill required along the existing embankment necessary to provide a 2:1 slope and toe protection for the placement of the revetment. Any established benthic and intertidal zone fauna would be impacted along the bank during this time. It is assumed that benthic and intertidal populations are low along the bank due to wave action, tidal currents, and continued erosion. Turbidity and sedimentation resulting from the bank construction would be minor due to the heavy nature of the sand substrate on the bank.

In general, stone riprap with a highly irregular facing and a shallow slope is favored biologically over gabions or grout-filled bags with a smoother surface. Irregular faces tend to dissipate wave energy better and have a greater ability to support various organisms. As currently observed on the 1988 constructed portion of the revetment, numerous species of mussels and algae are using the stone revetment as an attachment substrate (Photo 4).

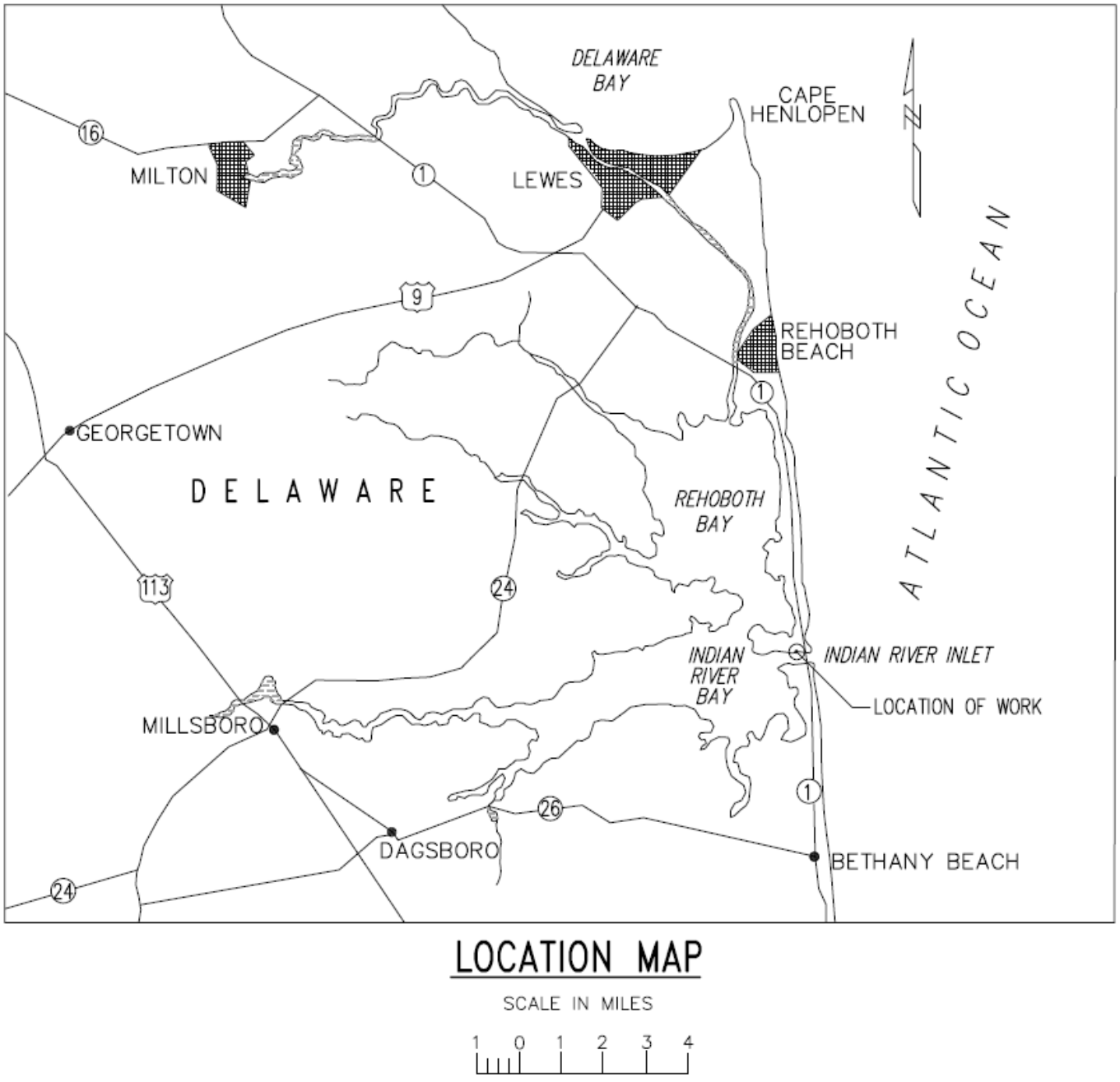

Figure 1. Indian River Inlet project location map.

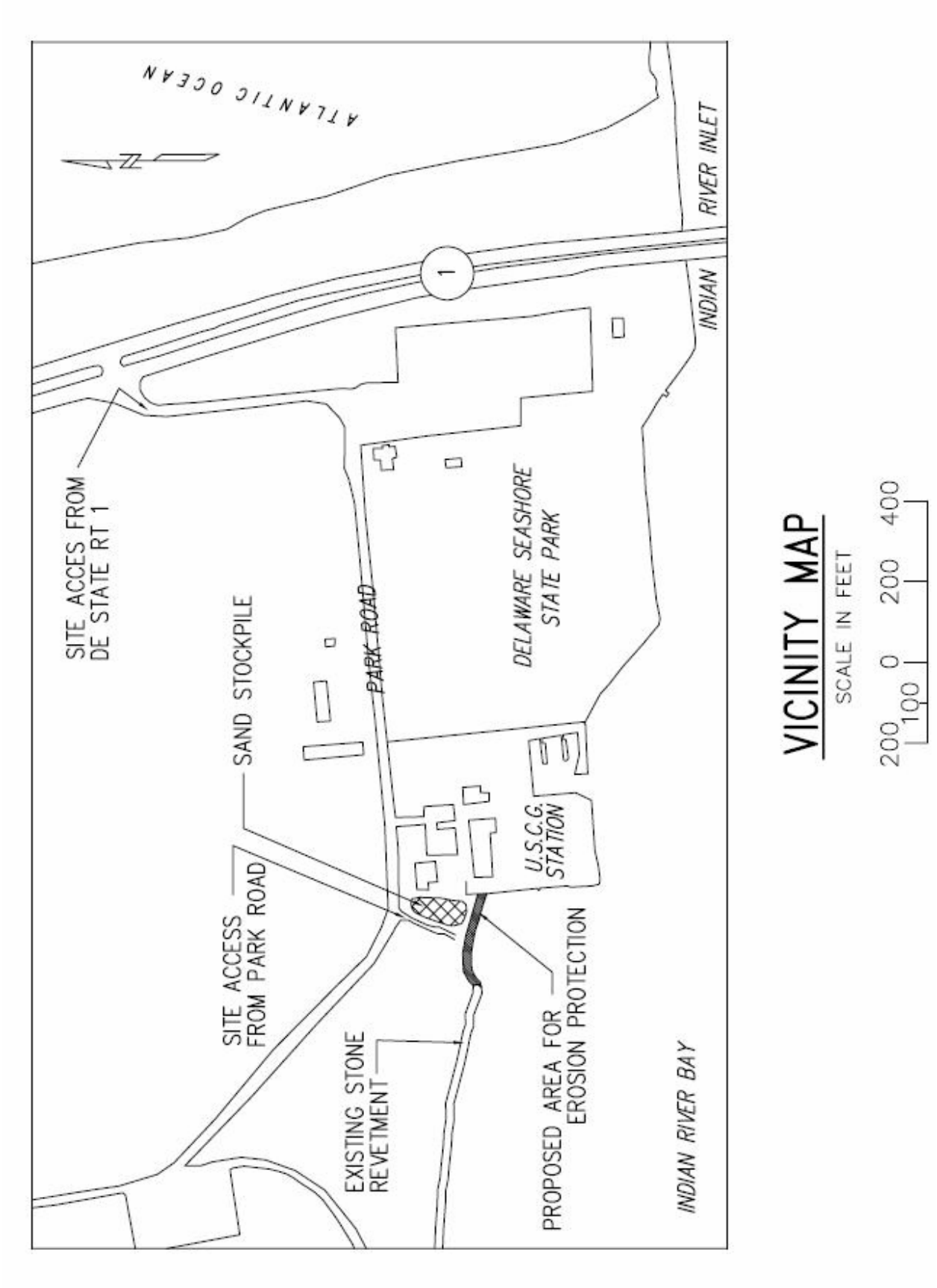

Figure 2. Indian River Inlet project area.

Photo 1. Project site with an eroding shoreline (looking eastward) (photo December 2004).

Photo 2. Existing conditions of the project site (looking westward) showing the sandbags that were placed as a temporary erosion control measure (photo January 2006).

Photo 3. Repair work needed on failures from the 1988 constructed revetment (photo August 2004).

Photo 4. Mussels and algae growing on the existing stone revetment that was constructed in 1988 (photo August 2004).

Adverse impacts resulting from bulkhead construction would be similar to revetment construction, but would involve substantially more fill. It would also have short-term impacts on turbidity and burial of established intertidal flora and fauna. In addition, a bulkhead does not have the irregular surfaces that would provide attachment substrate for mussels or algae.

Initial construction impacts for beach renourishment would be similar to the other alternatives discussed, but would result in a greater plume due to the increased amount of fill necessary. A greater number of benthic organisms would be buried due to the larger area disturbed by the filling operation. This alternative would require a two year maintenance cycle on sand fill which would degrade the water quality over the life of the project. A summary of the alternatives can be found in Table 1.

Overall, adverse environmental effects from embankment stabilization on the north interior shoreline would be minor and short-lived for all alternatives except beach renourishment. The alignment of the proposed new stone revetment will reflect the contour of the eroded shoreline and the not the original revetment. This will minimize the amount of backfill needed for the stone revetment. Environmentally, a stone revetment is the preferred alternative because it maximizes the potential benefits of the increased habitat hetergeniety. Our preferred design alternative (stone revetment) is the most cost effective and least environmentally damaging alternative that would meet the project goals (Figure 3). In addition, the design for the repair of the existing stone revetment can be seen in Figure 4.

Table 1. Comparison of Major Alternatives for the Indian River Inlet project.

Alternative	Potential Issues / Support	Cost	Benefits	Conclusion
No Action	Does not solve the problem.	$0	None	Not recommended.
Stone Revetment (original alignment)	- Short-term environmental impact during construction. - Additional fill would be needed to match original alignment. - Continuation of existing structure and completion of original 1988 project.	$850,000 (estimate)	- Stops erosion for life of the structure (25 years). - Provides limited habitat for benthic organisms and aquatic vegetation.	Not recommended.
Stone Revetment (eroded shoreline alignment)	- Short-term environmental impact during construction. - Supported by resource agencies. - Continuation of existing structure and completion of original 1988 project.	$800,000 (estimate)	- Stops erosion for life of the structure (25 years). - Provides limited habitat for benthic organisms and aquatic vegetation.	Recommended.
Sheet Piling	- Short-term environmental impact during construction and long-term impact with the loss of shallow water habitat. - Most costly	$950,000 (estimate)	- Stops erosion for life of the structure (50 years).	Not recommended.

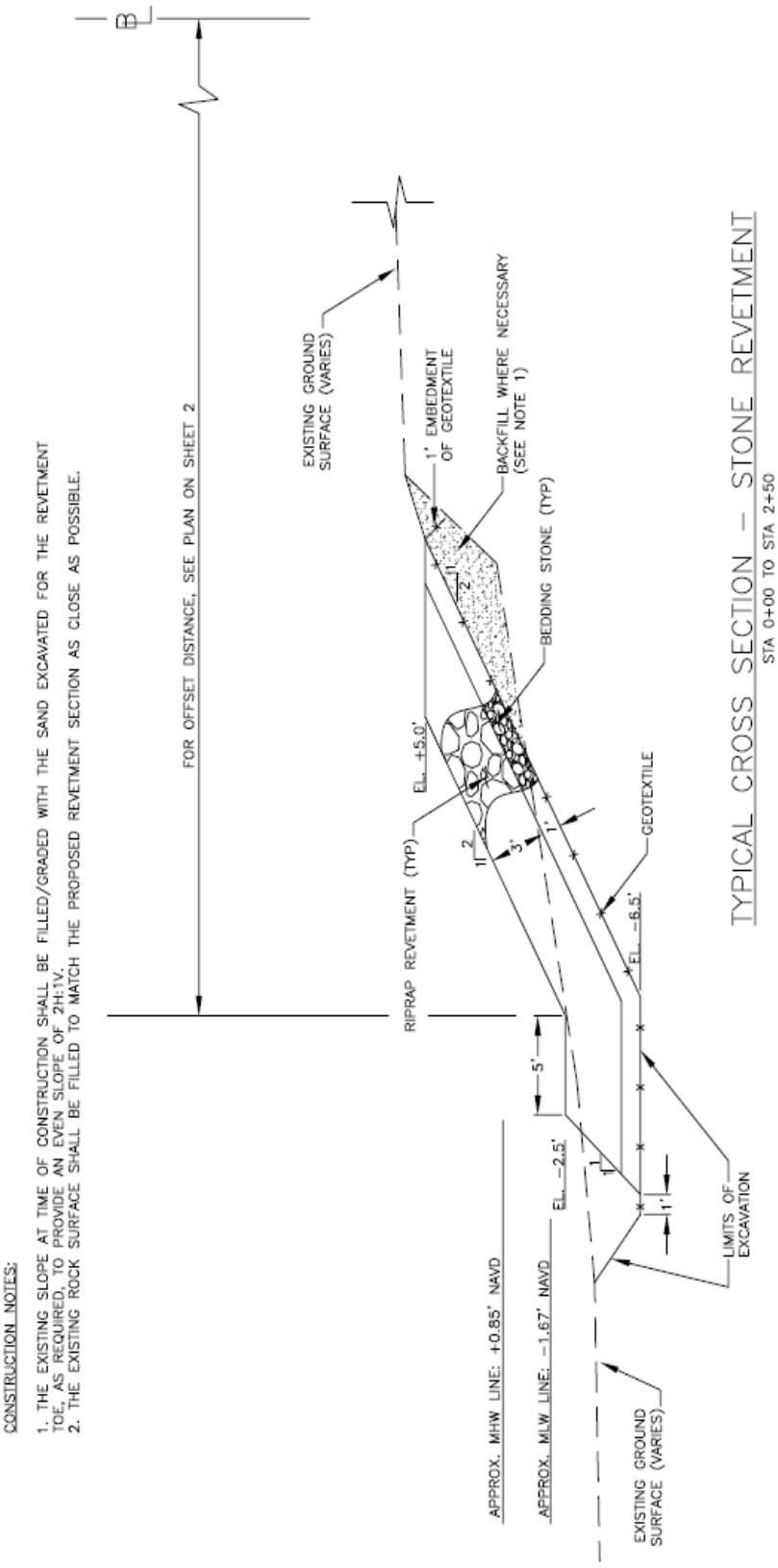

Figure 3. Indian River Inlet project design.

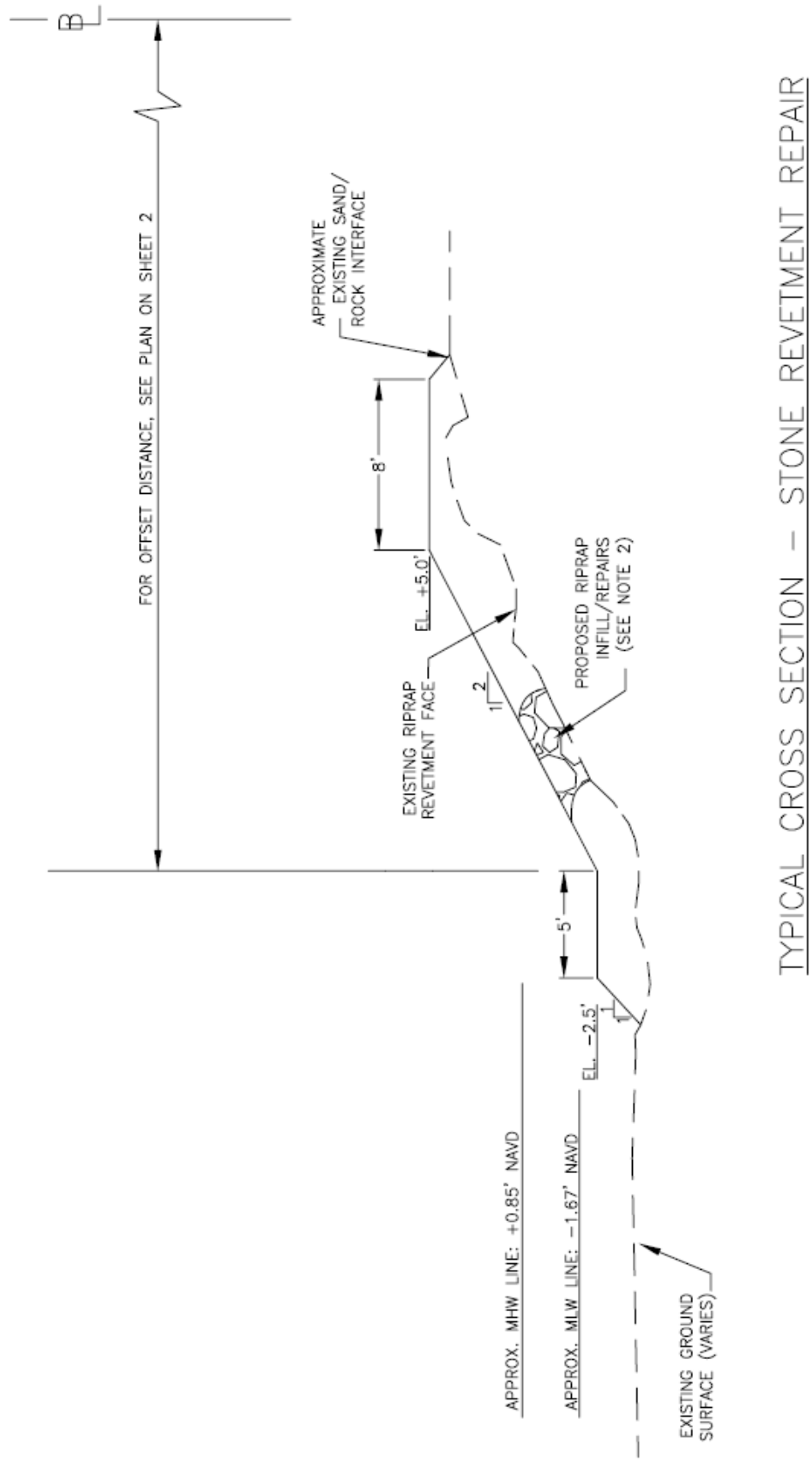

Figure 4. Indian River Inlet revetment repair project design.

5.0 Existing Environment

The project area is the northern interior shoreline of Indian River Inlet, adjacent to the U.S. Coast Guard Facilities located in Sussex County, Delaware. There is an existing 1580 ft long stone revetment constructed in 1988 at the project site.

5.1 Wetlands

There are no wetlands in the project area. The project site is an eroding shoreline in Sussex County, Delaware.

5.2 Fishery Resources

Surveys conducted in the 1960s in the project area identified 38 species in Indian River Bay. Five of those species accounted for 92% of the catch. These species were striped killifish, Atlantic silverside, mummichog, winter flounder, and bay anchovy. Although Indian River Bay does not support a commercial fishery, it indirectly contributes by serving as a spawning and nursery area for several economically valuable species. Species known to spawn in the bay include winter flounder, bay anchovy, Atlantic menhaden, Atlantic silverside, and hogchoker. Species known to use the upper estuary as a nursery area, include spot, weakfish, Atlantic menhaden, and bluefish. Recreational fishing in Indian River Bay is popular and sport fishes include winter and summer flounder, snapper blue fish, striped bass, and blowfish.

Essential Fish Habitat

Under provisions of the Magnuson-Stevens Act, areas along the Atlantic coast, including the proposed project area are designated as Essential Fish Habitat (EFH) for species with Fishery Management Plans (FMP's). The NMFS has identified EFH within 10' X 10' square coordinates. The study area contains potential EFH for various life stages for 21 species of managed fish. Table 2 presents the managed species and their life stage that EFH is identified in the Indian River Inlet area. The habitat requirements for the identified EFH species and their representative live stages are provided in Table 3.

Table 2. Summary of Essential Fish Habitat (EFH) Designation for Indian River Inlet (NMFS Website, 2004).

Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod *(Gadus morhua)*				X
red hake *(Urophycis chuss)*	X	X	X	
winter flounder *(Pleuronectes americanus)*	X	X	X	X
windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X
Atlantic sea herring *(Clupea harengus)*			X	X
monkfish *(Lophius americanus)*	X	X		

bluefish *(Pomatomus saltatrix)*			X	X
Atlantic butterfish *(Peprilus triacanthus)*			X	X
summer flounder *(Paralichthys dentatus)*		X	X	X
scup *(Stenotomus chrysops)*	n/a	n/a	X	X
black sea bass *(Centropristis striata)*	n/a		X	X
king mackerel *(Scomberomorus cavalla)*	X	X	X	X
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X
cobia *(Rachycentron canadum)*	X	X	X	X
sand tiger shark *(Odontaspis taurus)*		X		X
Atlantic angel shark *(Squatina dumerili)*		X	X	X
Atl. sharpnose shark *(Rhizoprionodon terraenovae)*				X
dusky shark *(Carcharhinus obscurus)*		X		
sandbar shark *(Carcharhinus plumbeus)*		X	X	X
scalloped hammerhead shark *(Sphyrna lewini)*			X	
tiger shark *(Galeocerdo cuvier)*		X		

Table 3. Habitat Utilization of Identified EFH Species Identified in the Indian River Inlet (NMFS Website, 2004)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Atlantic cod *(Gadus morhua)*				Bottom habitats Rocks, pebbles, gravel Temps <10 C 29-34% salinity 10-150 m depth
red hake *(Urophycis chuss)*	Surface waters of inner continental shelf, peaks in June and July. Temps <10 C <25% salinity	Surface waters, peaks in Sept and Oct. Temps <19 C >0.5% salinity <200 m depth	Bottom habitats with shell fragments Temps <16 C 31-33% salinity <100 m depth	Bottom habitats in depressions (mud or sand) Temps <12 C 33-34% salinity 10-130 m depth
winter flounder *(Pleuronectes americanus)*	Bottom habitats (muddy sand, sand, gravel), February to June. Temps <10 C 10-30% salinity <5 m depth	Pelagic and bottom waters, March to July. Temps <15 C 4-30% salinity <6 m depth	Bottom habitats (mud or fine grained sand) Temps <25 C 10-30% salinity 1-50 m depth	Bottom habitats (mud, sand, gravel) Temps <25 C 15-33% salinity 1-75 m depth
windowpane flounder *(Scopthalmus aquosus)*	Surface waters, peaks May and Oct Temps <20 C <70 m depth	Pelagic waters, peaks May and Oct Temps <20C <70 m depth	Bottom habitats (mud or fine grained sand) Temps <25 C 5.5-36% salinity 1-100 m depth	Bottom habitats (mud or fine grained sand) Temps <26.8 C 5.5-36% salinity 1-100 m depth
Atlantic sea herring *(Clupea harengus)*			Pelagic waters and bottom habitats Temps <10 C 26-32% salinity 15-135 m depth	Pelagic waters and bottom habitats Temps <10 C >28% salinity 20-130 m depth
monkfish *(Lophius americanus)*	Surface waters, March to Sept Temps <18 C 15-1000 m depth	Pelagic waters, peaks March to Sept Temps 15 C 25-1000 m depth		
bluefish *(Pomatomus saltatrix)*			Pelagic waters, Mid-Atlantic estuaries May to Oct Temps 19-24 C 23-36% salinity	Pelagic waters, Mid-Atlantic estuaries April to Oct Temps 14-16 C >25% salinity
Atlantic butterfish *(Peprilus triacanthus)*			Pelagic waters, estuaries spring to fall Temps 3-28 C 3-37% salinity 1-365 m depth (most <120)	Pelagic waters, estuaries summer to fall Temps 3-28 C 4-26% salinity 10-365 m depth (most <120)
summer flounder *(Paralichthys dentatus)*		Pelagic waters, peaks May and Oct Temps 9-12 C 23-33% salinity 10-70 m depth	Demersal waters (mud, but prefers sand) Temps >11 C 10-30% salinity 0.5-5 m depth	Demersal waters and estuaries 0-25 m depth
scup *(Stenotomus chrysops)*			Demersal waters, spring and summer in estuaries and bays Temps >7 C >15% salinity 0-38 m depth	Demersal waters and inshore estuaries Temps >7 C >15% salinity 2-185 m depth

Table 3. Habitat Utilization of Identified EFH Species Identified in the Indian River Inlet (NMFS Website, 2004)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
black sea bass *(Centropristis striata)*			Estuaries in spring and summer; rough bottom, shellfish, and eelgrass beds Temps >6 C >18% salinity 1-38 m depth	Inshore estuaries from May to Oct; structured habitat sand and shell substrates preferred Temps >6 C >20% salinity 20-50 m depth
king mackerel *(Scomberomorus cavalla)*	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity
Spanish mackerel *(Scomberomorus maculatus)*	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >30% salinity
cobia *(Rachycentron canadum)*	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >25% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >25% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >25% salinity	All coastal inlets; sandy shoals, rock bottom, surf zone Temps >20 C >25% salinity
sand tiger shark *(Odontaspis taurus)*		Shallow coastal waters <25 m depth		Shallow coastal waters <25 m depth
Atlantic angel shark *(Squatina dumerili)*		Shallow coastal waters <25 m depth	Shallow coastal waters <25 m depth	Shallow coastal waters <25 m depth
Atl. sharpnose shark *(Rhizopriondon terraenovae)*				Shallow coastal waters <25 m depth
dusky shark *(Carcharhinus obscurus)*		Shallow coastal waters, inlets, and estuaries <25 m depth		
sandbar shark *(Carcharhinus plumbeus)*		Shallow coastal waters <25 m depth	Shallow coastal waters <25 m depth	Shallow coastal waters <50 m depth
scalloped hammerhead shark *(Sphyrna lewini)*			Shallow coastal waters <200 m depth	
tiger shark *(Galeocerdo cuvier)*		Shallow coastal waters <200 m depth		

5.3 Wildlife Resources

The invertebrate community in the vicinity of Indian River Inlet is productive and diverse. Sampling in this area conducted in the 1970s identified blue crabs, hydroids, bryozoans, snails, limpets, polychaete worms, hermit crabs, lady crabs, and amphipods. The hard clam was found within one mile of the west end of the inlet channel. This is the most commercial shellfish resource in Indian River Bay, though production has declined due to extensive harvesting and a lack of suitable substrate. The number of commercial oyster landings has also

declined, and blue crabs are only harvested for recreation. In addition, recent observations (see Photo 4) indicate that blue mussels are using the 1988 constructed revetment as habitat, as well as, barnacles (sp.).

This portion of Delaware Bay is highly utilized by waterfowl, sea, and wading birds. The most common species of waterfowl are American brant, canvasback, scaup, scoter, and merganser. Other shorebirds using this area include heron, egret, rail, sandpiper, osprey, and tern.

Mammals which are indicative of the coastal zone and may occur in and around the project area are: muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), woodchuck (*Marmota monax*), chipmunk (*Tamias striata*), and eastern cottontail (*Sylvilagus floridanus*).

5.4 Air and Water Quality

Ambient air quality is monitored by Delaware Department of Natural Resources and Enviromental Control‘s (DNREC) Division of Air and Waste Management and is compared to the National Ambient Air Quality Standards (NAAQS) throughout the state, pursuant to the Clean Air Act of 1970. Six principal "criteria" pollutants are part of this monitoring program, which include ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM10), and lead (Pb). Sources of air pollution are broken into stationary and mobile categories. Stationary sources include power plants that burn fossil fuels, factories, boilers, furnaces, manufacturing plants, gasoline dispensing facilities, and other industrial facilities. Mobile sources include vehicles such as cars, trucks, boats, and aircraft.

Sussex County, Delaware within which the Federal Action will take place is classified as severe nonattainment for ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). The Indian River Inlet project site is within the Philadelphia-Wilmington-Trenton Nonattainment Area (PA-NJ-DE-MD).

Indian River Bay is an estuary fed by freshwater streams and tidal flushing from the Atlantic Ocean. Freshwater inflow is estimated to be on the order of one percent of the volume attributed to tidal flushing. Freshwater inflow comes into the bay through three major tributaries. Tides are semidiurnal with a mean range of 2.3 feet at the U.S. Coast Guard Station gage at the inlet.

Water quality in Indian River Bay is generally good and considered suitable for primary contact recreation. Mild eutrophication, resulting in increased primary productivity, is common in the shallow open bay during the summer. This eutrophication is attributed to non-point source pollution such as fertilizer runoff and malfunctioning septic systems.

5.5 Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS), the proposed project will have no effect on federally listed species (see Project Correspondence - Appendix A). They both concluded that there are no endangered or threatened species under their jurisdiction in the project area. In addition, no State-listed species have been identified in the project area (Appendix A).

5.6 Cultural Resources

Four historic properties are located in the general area: White House Farm, Prince George Chapel, the Isaac Harmon Farm, and the Indian River Life Saving Station. White House Farm is an early eighteenth century brick plantation house on the north side of Indian River Bay that is oriented towards the river. Prince George Chapel is a mid-eighteenth century wood frame public structure in the community of Dagsboro. The Isaac Harmon Farm is a mid-nineteenth century vernacular structure on the Nanticoke Indian community north of Indian River. The Indian River Life Saving Station is a late nineteenth century wood frame structure of Victorian design located north of the bay inlet on the Atlantic coast. All of these historic properties are outside of the current project’s area

of potential effect.

There are a significant number of prehistoric and proto-historic archaeological sites recorded within the larger Indian River and Bay area. Four of these sites are listed on the National Register of Historic Places. They include the Townsend Island Site, the Possum Point Site, and Swan Creek (No. 2) Site which together comprise the Indian River Middle Woodland Archaeological complex. The fourth prehistoric archaeological resource is the Poplar Thicket Site. All of these sites fall outside of the current project's area of potential effect.

The 1978 Cultural Resources Overview by Gilbert/Commonwealth of Indian River and Bay designated the original (1987) shoreline protection project area as a low sensitivity zone with respect to prehistoric archaeological resources. The Philadelphia District's 1987 Environmental Assessment noted that the entire surface north of the inlet now appears to be covered by dredged material of varying depths. An on-site inspection of the project area by the District Archaeologist in 2004 revealed no cultural deposits exposed in the eroding shoreline.

6.0 Environmental Impacts

6.1 Wetlands

There will be no impacts, since wetlands are not found in the project area.

6.2 Fishery Resources

Impacts on finfish would be minimal due to their ability to avoid the project area during the construction period. The cut and fill operation would increase turbidity levels on a short-term basis, which could reduce fish utilization of the project area. A loss of benthic organisms within the project area could limit the quantity of food organisms available to some species of fish. Fish populations would most likely utilize a different portion of the bay and return after the disturbance is completed.

Essential Fish Habitat

Assesment: Based on the listed habitat utilization by the designated EFH species (see Section 5.2), it appears that most of the species will not be found in the immediate project area, due to a depth requirement or the fact that they are very migratory in nature (i.e, the sharks). There is the potential for a few species to be found in the project area and these would include: winter flounder, windowpane flounder, summer flounder, scup, king mackerel, Spanish mackerel, and cobia. Most of the listed fish species are not estuarine resident species and therefore only utilize this area on a seasonal basis, primarily in the warmer summer months. During the summer months the estuary is typically utilized as a forage area for juveniles and adults and nursery area for larvae and juveniles. The only apparent exception to this is winter flounder which spawns in the estuary, generally from February through June.

The proposed in water work is scheduled to be undertaken from July 2006 – September 2006. Since adults and juveniles of the listed species are mobile, it is expected that they will avoid the areas of disturbance and therefore will not be impacted. Winter flounder, however, spawn during the months immediately prior to the time that construction will be occurring. Since winter flounder lay demersal eggs, there is a potential that the construction activities will adversely impact eggs in the proposed areas of disturbance. The area of winter flounder EFH disturbance is relatively small scale (1.8 acres) compared to the suitable habitat available to winter flounder adjacent to the project site within Indian River Bay. In a worst case scenario, 1.8 acres containing winter flounder eggs will be adversely impacted for one season. The affected area would be available for deposition of winter flounder eggs in subsequent years after the dredging activities are completed

Cumulative Effects on Essential Fish Habitat: We do not anticipate any cumulative effects associated with this project on EFH and managed species. The project will change the habitat for fish from a sandy bottom area to a

rocky substrate area. This will probably result in a change in species utilizing the area. We conclude that the project will have a minimal direct effect on EFH and not result in cumulative impacts to EFH.

Conclusion: Based upon the project design, the minimal short-term impacts associated with construction of the stone revetment, the Corps believes that the potential adverse impacts to EFH will not be substantial.

6.3 Wildlife Resources

Initial construction activities would result in a loss of some benthic organisms, especially non-motile species in the immediate vicinity through burial or displacement. This would be a short-term impact as benthic recovery normally begins soon after the disturbance has ended, and is usually completed within one year. The replacement of the existing sandy bottom with revetment would cause a shift in the benthic species utilizing the project area from those that live on or in sand to those that prefer a rock substrate. Various species of bivalves, polychaetes, and amphipods that require sandy sediment would not colonize the project site after placement of the revetment. The revetment would be suitable for a variety of bryozoans, hydroids, amphipods, barnacles, snails, and mussels (see Photo 4 of mussels using the 1988 constructed revetment). The long-term impact to the benthic community would not be significant due to the availability of sand substrate adjacent to the project site.

In addition, an approximately 630 feet by 10 feet area along the existing revetment would be impacted to complete the repairs of the revetment that was constructed in 1988. This area is currently vegetated with groundsel bush (*Baccharis halimifolia*), beach heather (*Hudsonia tomentosa*), and other plant species that have colonized the area since 1988 (Photo 5). This area will be restored with new plantings (native species) after construction is completed.

Photo 5. Existing vegetation that will be impacted to complete repairs to 1988 revetment (photo August 2004).

6.4 Air and Water Quality

General Conformity Review and Emission Inventory
Indian River Inlet

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the Indian River Inlet, the Federal Action is to complete a 900 ft stone revetment project. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction. Sussex County, Delaware within which the Federal Action will take place is classified as severe nonattainment for ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). The Indian River Inlet project site is within the Philadelphia-Wilmington-Trenton Nonattainment Area (PA-NJ-DE-MD).

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system. GC however is applicable. Therefore, the total direct and indirect emissions associated with the Indian River Inlet project must be compared to the GC trigger levels presented below.

Pollutant	General Conformity Trigger Levels (tons per year)
NOx	25
VOCs	25

To conduct a general conformity review and emission inventory for the Indian River Inlet project, a list of equipment necessary for construction was identified. Pertinent pieces of equipment include: a dewatering pump, bulldozers (various), front loaders, cranes (various), and welders. Table 1 (Appendix B) lists these pieces of equipment along with the number of engines, engine size (hp), and duration of operation. A Load Factor (LF) was also selected for each engine, which represents the average percentage of rated horsepower used during a source's operational profile. Load factors were taken from other General Conformity Reviews and Emission Inventories.

Table 1 (see Appendix B) shows the estimated hp-hr required for each equipment/engine category. Hp-hr was calculated using the following equation:

hp-hr = # of engines*hp*LF*hrs/day*days of operation

The second calculation is to derive the total amount of emissions generated from each equipment/engine category by multiplying the power demand (hp-hr) by an emission factor (g/hp-hr). The following equations were used:

emissions (g) = power demand (hp-hr) * emission factor (g/hp-hr)

emissions (tons) = emissions (g) * (1 ton/907200 g)

Table 2 (see Appendix B) provides the NOx and VOC emission factors selected for each equipment/engine category. These factors were also taken from other General Conformity Reviews and Emission Inventories.

Tables 3 and 4 (see Appendix B) present the emission estimates for NOx and VOCs, respectively. The tables present the emissions from each individual equipment/engine category and the combined total.

The total estimated emissions that would result from construction of the Indian River Inlet project are 1.3 tons of NOx and 0.2 tons of VOCs. These emissions are below the General Conformity trigger levels of 25 tons per year for each pollutant. General Conformity under the Clean Air Act, Section 176 has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total direct and indirect emissions from the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and VOCs) in a Severe Nonattainment Area (25 tons of each pollutant per year). The project is not considered regionally significant under 40 CFR 93.153 (i).

Impacts to water quality are considered to be short-term and minor. Turbidity and sedimentation resulting from the bank construction would be minor due to the heavy nature of the sand substrate of the bank. There would also be little impact to dissolved oxygen levels due to the low organic content of the sand. There would be no long-term adverse impacts to water quality resulting from the project.

6.5 Threatened and Endangered Species

Impacts to State or Federally endangered or threatened species are not expected from this project. Coordination letters under Section 7 of the Endangered Species Act have been received by FWS and NMFS concurring with our finding that the proposed project will have no impacts on Federally-listed species (Appendix A.). In addition, a letter has also been received from DNREC stating that no State-listed species are found in the project area (Appendix A).

6.6 Cultural Resources

In a letter dated February 24, 2005 the Delaware State Historic Preservation Office concurred with Philadelphia District that the proposed project will have no effect on cultural resources.

7.0 Relationship of Selected Plan to Environmental Requirements, Protection Statutes, and Other Requirements

In accordance with Section 401 of the Clean Water Act, a Water Quality Certification has been obtained from DNREC (Appendix A). Based on the information gathered during the preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(C) of the Coastal Zone Management Act of 1972 that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of Delaware. The Delaware Coastal Zone Management Program has determined that the project is consistent with the State Coastal Zone Plan (Appendix A). In addition, no cumulative impacts are anticipated to the environment as a result of this project.

TABLE 4. Compliance with Appropriate Environmental Quality Protection Statues and Other Environmental Review Requirements.

STATUTE	COMPLIANCE STATUS
Clean Water Act	Full
Coastal Zone Management Act	Full
Endangered Species Act	Full
Fish and Wildlife Coordination Act	Full
National Historic Preservation Act	Full
National Environmental Policy Act	Partial
Clean Air Act	Full

NOTE:
Full Compliance: Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning.
Partial Compliance: Some requirements of the statute, E.O., or other policy and related regulations remain to be met.
*All applicable laws and regulations will be fully complied with upon completion of the environmental review, obtaining State water quality certification, coastal zone consistency determination, and concurrence with our determination on cultural resources.
Noncompliance: None of the requirements of the statute, E.O., or other policy and related regulations remain to be met.

8.0 Public Coordination

During preparation of the Draft Environmental Assessment, several agencies were contacted and provided information. This draft Environmental Assessment is being circulated to various state and federal agencies for comments. Coordination, discussions, and project site visits have been conducted with the FWS, NMFS, DNREC, the Environmental Protection Agency, as well as other agencies and individuals with interests in the project. See Appendix A for more detailed information on the coordination for this project.

9.0 Section 404(b)(1) Analysis

A review of the impacts associated with discharges to waters of the United States for the Indian River Inlet, Sussex County, Delaware is required by Section 404(b)(1) of the Clean Water Act, as amended (Public Law 92-500).

I. Project Description

A. Location. The project area is located in Sussex County, Delaware (Figure 1).

B. General Description. Indian River is located in Sussex County, Delaware (Figure 1). The project goal is to complete the construction of a stone revetment protecting a portion of the northern shoreline of the Indian River Inlet, adjacent to the U.S. Coast Guard Facilities, from erosion.

C. Purpose. The purpose of the project under Section 103 is to protect approximately 900 ft of eroding shoreline on the north shore of Indian River Inlet. To save costs, the construction of the original stone revetment in 1988 was limited to that portion of the shoreline actually eroding (1580 ft). The remaining approximately 270 feet of the unprotected shoreline along the northern interior of the Inlet has been subjected to increased erosion over the last decade. The purpose of this project is to complete the revetment and realize the full benefits of the stone protection. In addition, 630 ft of revetment repairs to the 1988 constructed project are included in this current project.

D. General Description of Dredged or Fill Material.

1. General Characteristics of Material: sand (2500 cubic yards), bedding stone (620 tons), geotextile (1400 square yards), revetment stone (1700 tons)

2. Quantity of Discharge (estimated): sand (2500 cubic yards), bedding stone (620 tons), geotextile (1400 square yards), revetment stone (1700 tons)

3. Source of Material: local contractor

E. Description of Discharge Site.

1. Location: The location of the discharge site will be the location of the construction site (see Figure 2).

2. Size (acres): 900 feet, approximately 0.25 acres

3. Type of Site: aquatic/shoreline

4. Type of Habitat: tidal/estuarine

5. Timing and Duration of Discharge: approximately 2 – 3 months for total project construction.

F. Description of Discharge Method. Material will be placed with a backhoe and a front-end loader.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations.

1. Substrate Elevation and Slope: +7 to -6.5 NAVD / existing slope is 6H:1V

2. Sediment Type: sand

3. Fill Material Movement: tidal

4. Physical Effects on Benthos: initial burial, resulting in temporary depletion, long-term increase

5. Actions taken to Minimize Impacts: standard best management construction practices to minimize turbidity and erosion.

B. Water Circulation, Fluctuation and Salinity Determinations.

1. Water:

a. Salinity - no effect.

b. Water Chemistry – no significant effect.

c. Clarity - short-term increase in suspended particles.

d. Color - no effect.

e. Odor – no effect.

f. Taste - no effect.

g. Dissolved Gas Levels – minor short-term effect.

h. Nutrients – no effect

I. Eutrophication - no effect.

j. Temperature- no effect.

2. Current Patterns and Circulation:

a. Current Patterns and Flow – tidal currents

b. Velocity – tidal, may exceed 6 feet per sec

c. Stratification - isothermal

3. Normal Water Level Fluctuations – semi-diurnal tidal changes, mean tidal range of 2.3 feet

4. Salinity Gradients - isohaline

5. Actions That Will Be Taken To Minimize Impacts: Construction best management practices will be used to minimize impacts.

C. Suspended Particulate/Turbidity Determinations.

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Fill Site: Minor effect. There is the potential for a short-term increase in suspended particles/turbidity levels during construction.

2. Effects on Chemical and Physical Properties of the Water Column:

a. Light Penetration: minor effect.

b. Dissolved Oxygen: minor effect.

c. Toxic Metals and Organics: no effect.

d. Pathogens: no effect.

e. Aesthetics: Minor adverse and temporary effects limited to the construction period.

f. Temperature: no effect.

3. Effects on Biota:

a. Primary Production, Photosynthesis: Minor, short-term effects related to increases in turbidity during construction activity.

b. Suspension/Filter Feeders: Minor, short-term effects related to increases in turbidity during construction activity.

c. Sight feeders: no effect.

4. Actions Taken to Minimize Impacts: Due to the coarse nature of the material (sand and rock), none are required.

D. Contaminant Determinations.

N/A

E. Aquatic Ecosystem and Organism Determinations.

1. Effects on Plankton: no effect.

2. Effects on Benthos: Major effect on benthos in construction area.

3. Effects on Nekton: no effect

4. Effects on Aquatic Food Web: temporary, minor effect.

5. Effects on Special Aquatic Sites:

(a) Sanctuaries and Refuges: none.

(b) Wetlands: none.

(c) Tidal flats: none.

(d) Vegetated Shallows: None.

6. Threatened and Endangered Species: No effect.

7. Other Wildlife: Temporary, minor effect.

8. Actions to Minimize Impacts: Standard best management construction practices to minimize turbidity and erosion.

F. Proposed Disposal Site Determinations.

1. Mixing Zone Determinations:
   a. Depth of water: < 10 ft.
   b. Current velocity: May exceed 6 ft. per sec. in main channel
   c. Degree of turbulence: Moderate turbulence during construction period
   d. Stratification: None
   e. Discharge vessel speed and direction: N/A
   f. Rate of discharge:
   g. Fill material characteristics: Sand and stone

2. Determination of Compliance with Applicable Water Quality Standards:
A section 401 Water Quality Certificate has been acquired from DNREC.

3. Potential Effects on Human Use Characteristics:

a. Municipal and Private Water Supply: No effect.

b. Recreational and Commercial Fisheries: Temporary, minor effect during construction.

c. Water Related Recreation: Temporary, minor effect.

d. Aesthetics: Temporary, minor effect.

e. Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves: No effect.

G. Determination of Cumulative Effects on the Aquatic Ecosystem.
No significant adverse effects are anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem.
No significant secondary effects are anticipated.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adaptation of the Section 404(b)(1) Guidelines to this evaluation - No significant adaptation of the guidelines were made relative to this evaluation.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem - The selected plan was determined from a detailed evaluation of alternatives to have the least amount of environmental impacts.

C. Compliance With Applicable State Water Quality Standards - The selected plan is not expected to violate any applicable state water quality standards in Delaware.

D. Compliance With Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act - The proposed discharge is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

E. Compliance With Endangered Species Act of 1973 -The selected plan will comply with the Endangered Species Act of 1973. Informal Section 7 consultation has been successfully completed with the U.S. Fish and Wildlife Service for this the project.

F. Compliance With Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 - No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are located within the project area.

G. Evaluation of Extent of Degradation of Waters of the United States - The proposed project will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish and shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and wildlife will not be adversely affected. Significant adverse impacts on aquatic ecosystem diversity, productivity and stability, and recreation, aesthetics and economic values will not occur as a result of the project.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem – The use of best management construction practices will be used to minimize potential adverse impacts of discharging material in the aquatic ecosystem.

10.0 CLEAN AIR ACT STATEMENT OF CONFORMITY

CLEAN AIR ACT STATEMENT OF CONFORMITY
INDIAN RIVER INLET
SUSSEX COUNTY, DELAWARE

I have determined that the selected plan conforms to the applicable State Implementation Plan (SIP). The Environmental Protection Agency had no adverse comments under their Clean Air Act authority. No comments from the air quality management district were received during coordination of the draft environmental assessment. The selected plan would comply with Section 176 (c)(1) of the Clean Air Act Amendments of 1990.

_____ _____

Date

Robert J. Ruch, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

Appendix A

Relevant Project Correspondence

Appendix B

Clean Air Assessment

General Conformity Review and Emission Inventory for Indian River Inlet
Table 1. Project Emission Sources and Estimated Power

hp-hr = # of engines*hp*LF*hrs of operation

Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile.

Equipment/Engine Category	# of engines	hp	LF	hrs of operation	hp-hr
Roller, Vib, Dbl, 25" x 14", 0.7T	1	5	0.62	76	236
Crane, Dragline/Crawler, 2 c/y, 65' Boom	1	125	0.43	281	15104
Crane, ME, Cwlr, Lifting, 100T, 230' Boom	1	263	0.43	75	8482
Ldr, F/E, Crwler, 1.5 cy bkt	1	90	0.55	75	3713
Ldr, BH, WH, 1.5 CY FE Bkt,	1	110	0.55	319	19300
Pile Hammer, Vib, 107T Force Drive	1	325	0.70	75	17063
Trk, Off-HWY, R-Dump, 13-18 CY, 25T	1	260	0.57	422	62540

Load Factors taken from the General Conformity Review and Emission Inventory for the Delaware River Main Channel Deepening Project. (May 2003). Prepared for the U.S. Army Corps of Engineers, Philadelphia District by Moffatt & Nichol Engineers.

General Conformity Review and Emission Inventory for Indian River Inlet
Table 2. Emission Estimates (NOx)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

NOx Emissions Factor for Off-Road Construction Equipment is 9.20 g/hp-hr

Equipment/Engine Category	**hp-hr**	**EF (g/hp-hr)**	**Emissions (tons)**
Roller, Vib, Dbl, 25" x 14", 0.7T	236	9.20	0.00
Crane, Dragline/Crawler, 2 c/y, 65' Boom	15104	9.20	0.15
Crane, ME, Cwlr, Lifting, 100T, 230' Boom	8482	9.20	0.09
Ldr, F/E, Crwler, 1.5 cy bkt	3713	9.20	0.04
Ldr, BH, WH, 1.5 CY FE Bkt,	19300	9.20	0.20
Pile Hammer, Vib, 107T Force Drive	17063	9.20	0.17
Trk, Off-HWY, R-Dump, 13-18 CY, 25T	62540	9.20	0.63
	Total NOx Project Emissions (tons) =		1.28

General Conformity Review and Emission Inventory for Indian River Inlet
Table 3. Emission Estimates (VOCs)

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

VOC Emissions Factor for Off-Road Construction Equipment is 1.30 g/hp-hr

Equipment/Engine Category	hp-hr	EF (g/hp-hr)	Emissions (tons)
Roller, Vib, Dbl, 25" x 14", 0.7T	236	1.30	0.00
Crane, Dragline/Crawler, 2 c/y, 65' Boom	15104	1.30	0.02
Crane, ME, Cwlr, Lifting, 100T, 230' Boom	8482	1.30	0.01
Ldr, F/E, Crwler, 1.5 cy bkt	3713	1.30	0.01
Ldr, BH, WH, 1.5 CY FE Bkt,	19300	1.30	0.03
Pile Hammer, Vib, 107T Force Drive	17063	1.30	0.02
Trk, Off-HWY, R-Dump, 13-18 CY, 25T	62540	1.30	0.09
Total VOCs Project Emissions (tons) =			0.18

General Conformity Review and Emission Inventory for Indian River Inlet

Table 4. Pollutant Emissions from Employee Vehicles

Assumptions:

Average trip distance (1 way) is 40 miles.
Average NOx vehicle emission factor is 0.96 g/mile.
Average VOC vehicle emission factor is 0.84 g/mile.
Work crew comprised of 6 people
Every member of the work crew drives their own vehicle.
Project construction period is 3 months.
Project construction occurs 20 days per month.
There are 4 weather days (no work) in this time period.

Actual work days = 20 days * 3 months - 4 weather days off.

Actual work days = 56 days

NOx Calculation: 6 workers * 2 trips/work day * 56 work days * 40 miles/trip * 0.96 g of NOx/mile* (1 ton/907200 g)

Total NOx resulting from employee vehicles = 0.03 tons.

VOC Calculation: 6 workers * 2 trips/work day * 56 work days * 40 miles/trip * 0.84 g of VOC/mile* (1 ton/907200 g)

Total VOCs resulting from employee vehicles = 0.02 tons.

Pollutant emissions associated with employee vehicles derived from data found in: Marine and Land-Based Mobile Source Emission Estimates for 50-Foot Deepening Project. January 2002. Prepared for The Port Authority of New York and New Jersey by Killam Associates and Starcrest Consulting Group, LLC.

Total (construction and employees) NOx Project Emissions (tons) = 1.3

Total (construction and employees) VOCs Project Emissions (tons) = 0.2